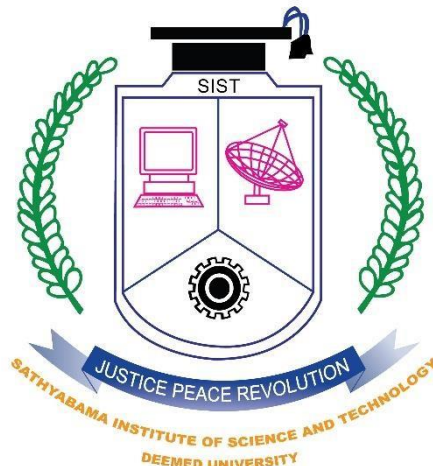


INTRODUCTION TO CLOUD

Submitted in partial fulfilment of the requirements for the
Professional training – I of
Bachelor of Engineering Degree in
Electrical and Electronics Engineering

BY

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MODULES OF (4 WEEK) MASTERCLASS

[Module 1 - Overview of Cloud Computing](#)

[Module 2 - Cloud Adoption and Emerging Technologies](#)

[Module 3 - Cloud Computing Service and Deployment Models](#)

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Computing

Module 5 - Cloud Computing Storage
and Content Delivery Networks

Module 6 - Emergent Trends, Cloud
Native, DevOps and Application
Modernization

INTRODUCTION

Cloud computing is the delivery of on-demand computing resources over the internet on a pay-as-you-go basis; resources are dynamically assigned and reassigned among multiple users and scale up and down in response to users' needs.

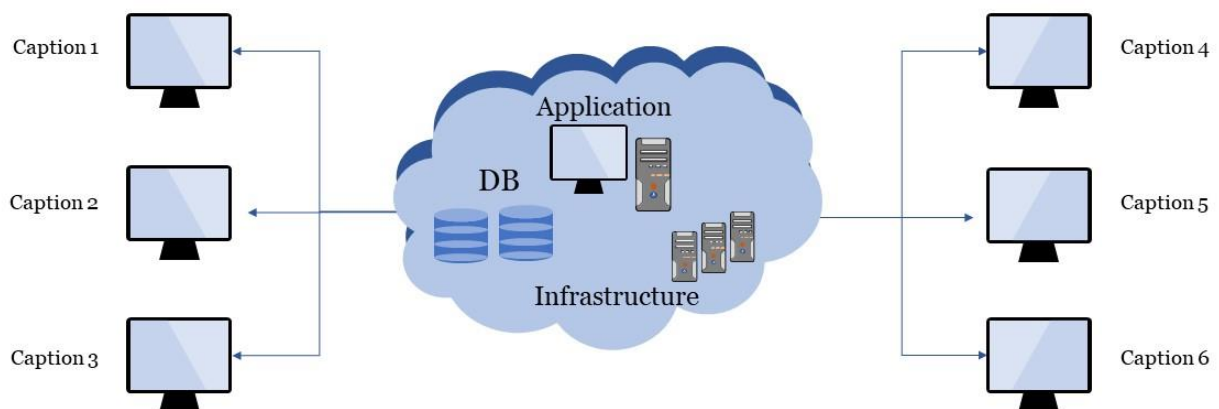
- The origins of cloud computing can be traced back to the mainframes of the 1950s, with virtualization technologies and hypervisors serving as catalysts for the emergence of modern-day cloud computing.
- Organizations must consider their business needs, investment viability, and risk capacity in order to create a cloud adoption strategy that delivers desired benefits without causing business disruptions and security, compliance, or performance issues.
- Cloud adoption is growing faster than predicted. Driving this technological wave are cloud service providers with a host of services ranging from Infrastructure, Platform, and Software services. Some major Cloud providers of our times include AWS, Alibaba Cloud, Google, IBM Cloud, and Microsoft Azure.

Cloud infrastructure consists of data centers, storage, networking components, and compute resources.

- Virtualization is the process of creating a software-based version of physical resources, made possible through the use of hypervisors.
- A few different types of Virtual Machines can be provisioned on the cloud. These include:
 - Shared or Public Cloud VMs that are providermanaged, multi-tenant deployments that can be provisioned on-demand with predefined sizes
 - Transient or Spot VMs that take advantage of unused capacity in a cloud data center
 - Reserved VMs that allow you to reserve capacity and guarantee resources for future deployments
 - Dedicated hosts that offer single-tenant isolation



Bare metal servers are single-tenant physical servers that are dedicated to a single customer. Bare metal servers fulfil the demanding needs of high-performance computing (HPC) and data intense applications and are ideal for applications that have a high degree of security or compliance requirements.

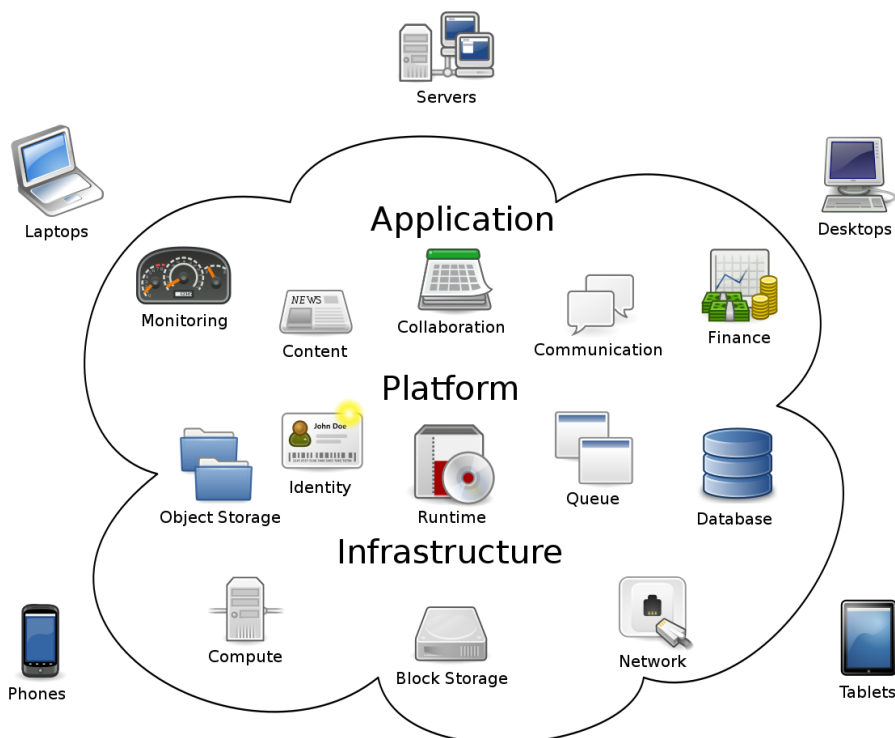


- Networking capabilities in the cloud are delivered as a service rather than in the form of rack-mounted devices. **Cloud resources, such as VMs (or VSIs), storage, network connectivity, and load balancers, are deployed into subnets within Virtual Private Clouds (VPCs).** Using private and public subnets allows users to deploy multi-tier enterprise applications securely. Load balancers distribute the traffic and allow applications to be responsive.

DEFINITION:

"The cloud" refers to servers that are accessed over the Internet, and the software and databases that run on those servers. Cloud servers are located in data centers all over the world.

It simply states that cloud computing means storing and accessing the data and programs over the internet rather than the computer's hard disk.



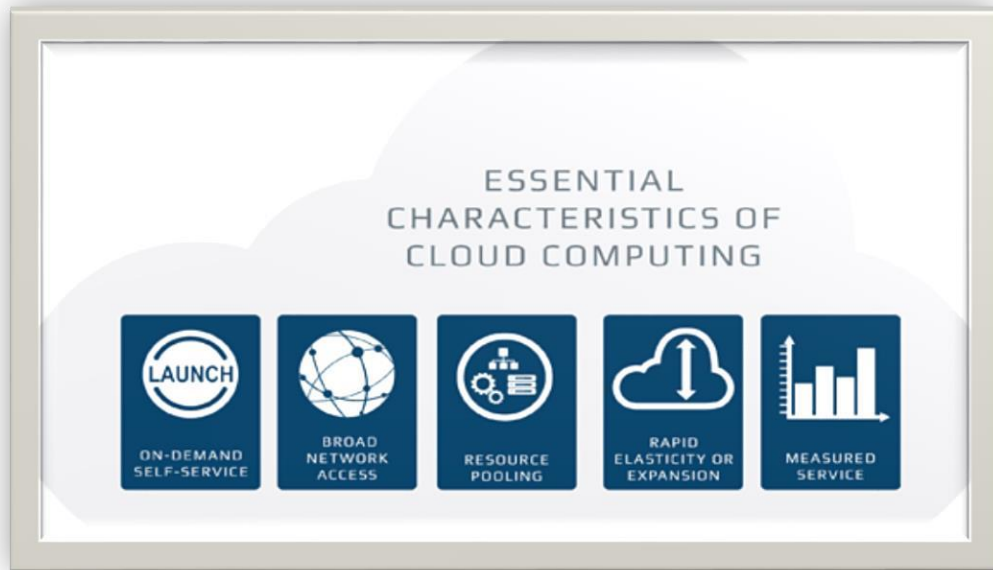
ACCESS AT ANY TIME ANY PLACE:

The cloud enables users to access the same files and applications from almost any device, because the computing and storage takes place on servers in a data center, instead of locally on the user device.

EXAMPLE • Instagram login

- Google
- Microsoft
- For businesses, switching to cloud computing removes some IT costs and overhead

ESSENTIALS CHARACTERISTICS OF CLOUD COMPUTING:



1. ON DEMAND SELF SERVICE
2. BROAD ACCESS NETWORK
3. RESEARCH POOLING
4. RAPID ELASTICITY
5. MEASURED SERVICES

HISTORY OF CLOUD COMPUTING:

Before cloud computing emerged, there was client/server computing, centralized storage in which all the data, software applications and all the controls reside on the server side.

Cloud computing is believed to have

been **invented** by Joseph Carl Robnett Licklider in the 1960s with his work on ARPANET to connect people and data from anywhere at any time.

The Cloud Computing concept came into the picture in the year 1950 with accessible via thin/static clients and the implementation of mainframe computers.

Then in 1961, John McCarthy delivered a speech at MIT in which he suggested that computing can be sold like a utility like electricity and food.

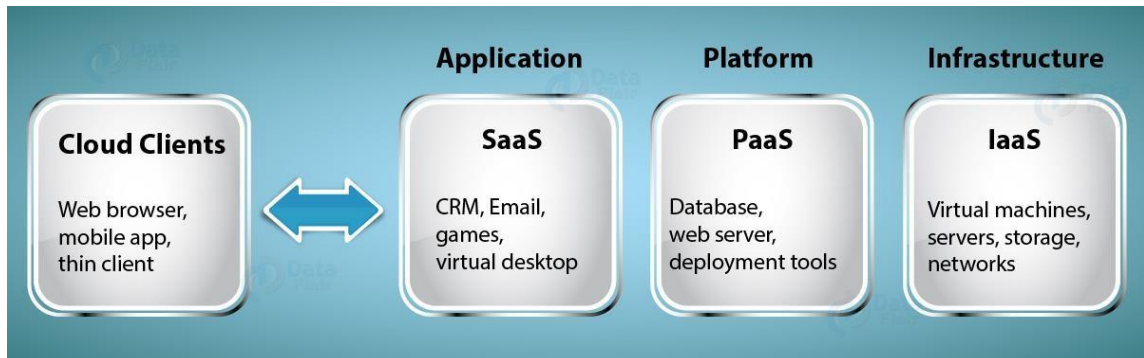
2002- **Amazon** came up with Amazon Web Services, providing services like computation, storage, and even human intelligence

2009- **Google Apps** and **Microsoft's Windows Azure** also started to provide cloud computing enterprise applications.

TYPES OF CLOUD COMPUTING:

1. SAAS (Software as a service)
2. PAAS (Platform as a service)
3. IAAS (Infrastructure as a service)

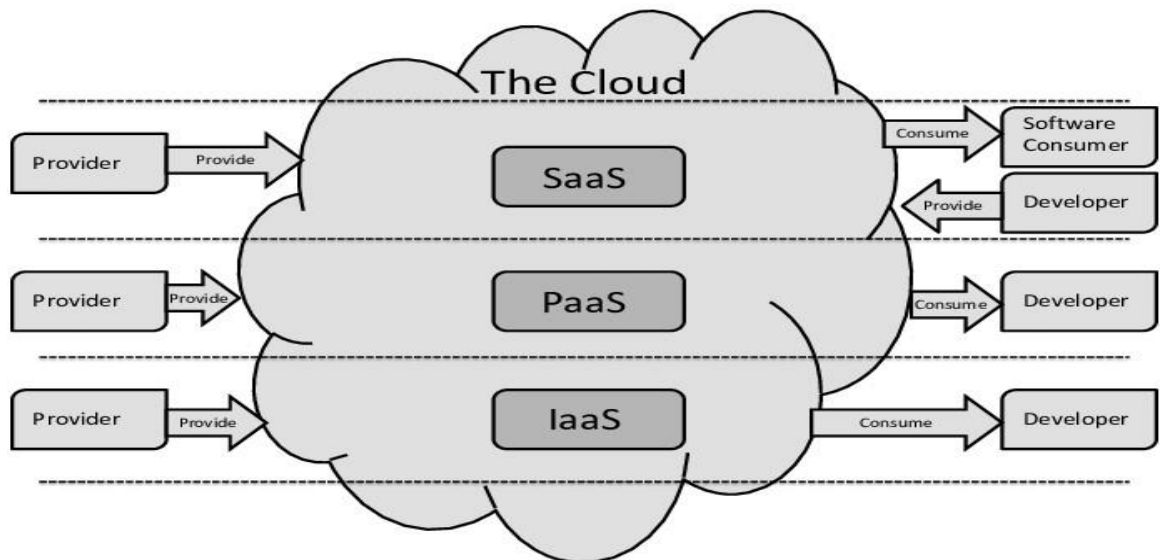
SAAS: SaaS stands for Software as a Service, provides a facility to the user to use the software from anywhere with the help of an internet connection.



IAAS: IaaS stands for **Infrastructure as a Service**. With the help of IAAS, the user can use IT hardware and software just by paying the basic price of it.

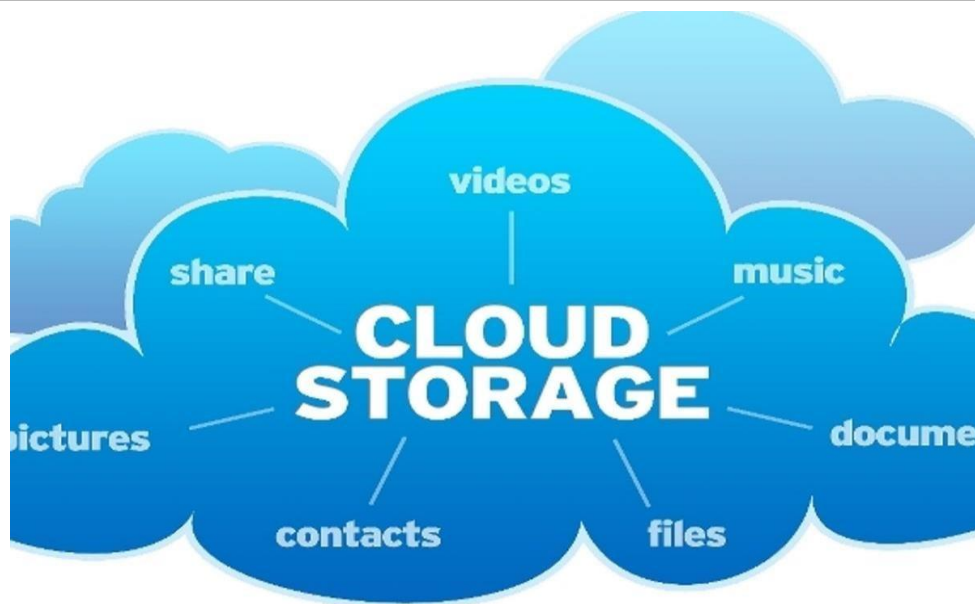
PAAS: PaaS stands for Platform as a Service. This helps the user by providing the facility to make, publish, and customize the software in the hosted environment.



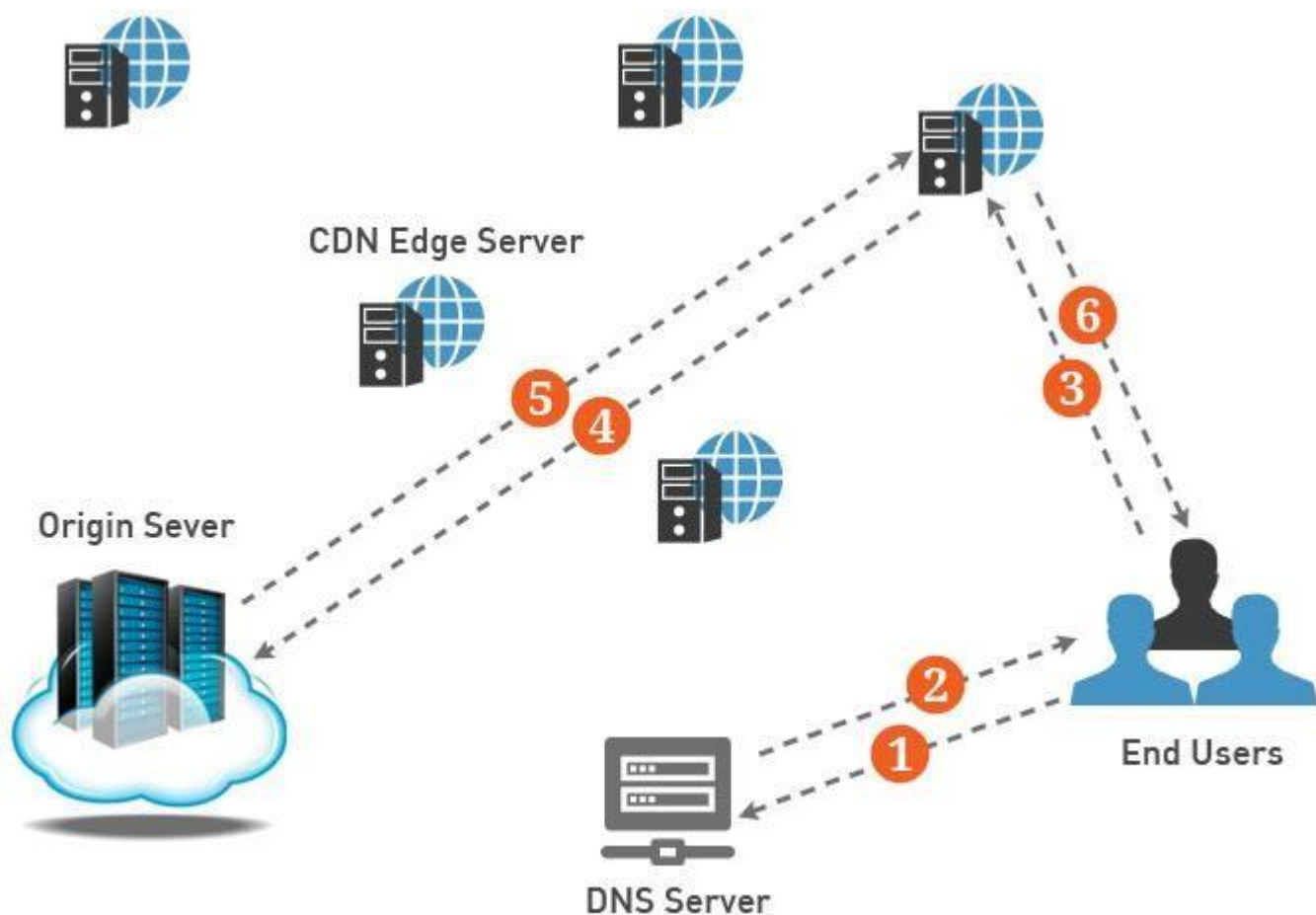


Infrastructure-as-a-Service, Platform-as-aService (PaaS), and Software-as-a-Service (SaaS).

- o **IaaS** provides the fundamental compute, network, and storage resources for customers on-demand.
- o **PaaS** provides customers the hardware, software, and infrastructure to develop, deploy, manage, and run applications created by them or acquired from a thirdparty.
- o **SaaS** provides access to users to a service provider's cloud-based software. Users simply access the applications on Cloud while the Cloud provider maintains the infrastructure, platform, data, application code, security, availability, and performance of the application.



- Cloud storage is available in four main types—**Direct Attached, File, Block, and Object Storage**. These storage types differ in how they can be accessed, the capacity they offer, how much they cost, the types of data they are best suited to store, and their read-write speed.
- **Direct Attached (or Local) Storage** is storage that is presented directly to a **cloud-based server** and is **effectively either within the host server** chassis or within the same rack.
- **File Storage** is typically **presented to compute nodes as a Network File System (NFS)**, which means that the storage is connected to compute nodes over a standard ethernet network.
- **Block Storage** is **presented to compute nodes using high-speed fibre connections**, typically provisioned in volumes, which are mounted onto a compute node.



- **Object Storage** is accessed via an API and doesn't need an underlying compute node. Object Storage offers infinite capacity as you can keep adding files to it and just pay for what you use. Compared to the other storage types, object storage is slowest in terms of read and write speeds.

- **A Content Delivery Network (CDN)** is a distributed server network that accelerates internet content delivery by delivering temporarily stored or cached

copies of website or media content to users based on their geographic location.

KEY CONSIDERATION OF CLOUD COMPUTING:

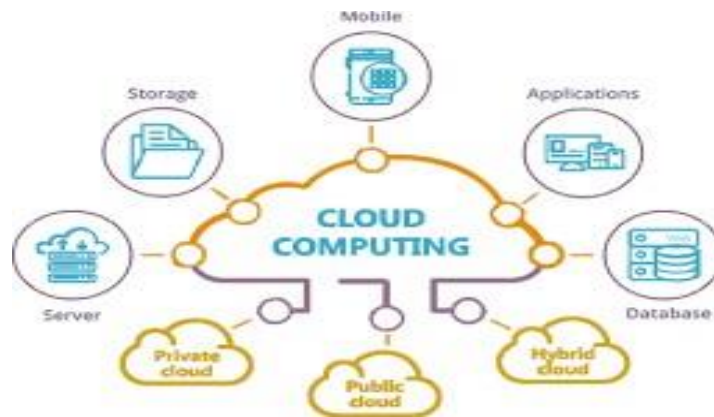
1. flexibility,
2. speed,
3. data integration,
4. functional ownership
5. service vs tools

ADVANTAGES OF CLOUD COMPUTING:

ECONOMICALLY: the user has many free opportunities reliable services available for no or low cost

24/7 AVAILABILITY: available every time queries and the issues are resolved with the help of technical support .

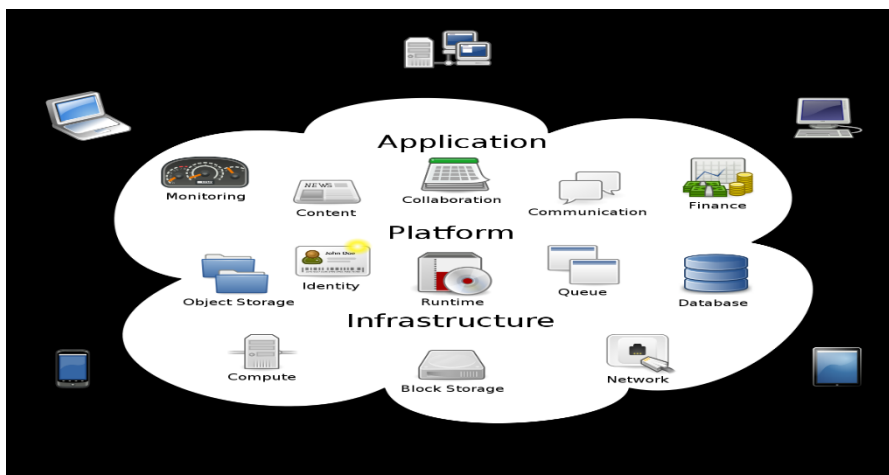
SECURITY: data has been saved at multiple places, there is no loss of data high level of security as the data stored is important and never be lost.



DIS ADVANTAGES:

- **DOWN TIME:** If the servers of the companies are not accurate so, this will lead to the downtime as it won't be able to perform properly.
- **VULNERABLE TO ATTACK:** internet there are chances that you suffer severe attacks as you are exposed to potential vulnerabilities

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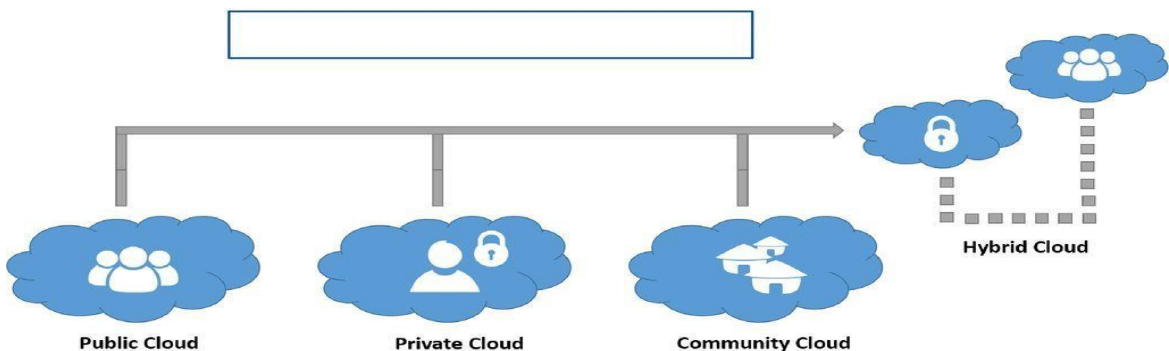
CLOUD COMPUTING DEPLOYMENT METHODS:

1. PRIVATE CLOUD
2. PUBLIC CLOUD

3. HYBRID CLOUD

4. COMMUNITY CLOUD

Cloud Deployment models:



CLOUD APPLICATION :

Cloud Computing can run every programs and software as a normal computer can run. It can also provide us with numerous applications which are free of cost. So, let's start elaborating these Cloud Computing applications one by one:

1. STORING FILE ONLINE
2. VIDEO MAKING AND EDITING
3. FILE CONVERTER
4. ANTIVIRUS APPLICATION
5. BACKUP AND RECOVERY



Cloud Computing

Having secure access to all your applications and data from any network device

ARTIFICIAL INTELLIGENCE IN CLOUD COMPUTING ??.

Artificial intelligence technology and cloud computing have already begun connecting “smart” machines.

Thermostats and smart appliances to self-driving cars.

“IOT” devices will eventually be able to gather data.

EXAMPLE: Thermostat

How Artificial Intelligence is Transforming Cloud Computing



BLOCK CHAIN:

BLOCK CHAIN:

A block chain is **a type of database.**

A database is **a collection of information** that is stored electronically on a computer system.

Information, or data, in databases is typically **structured in table format** to allow for easier searching and filtering for specific information.

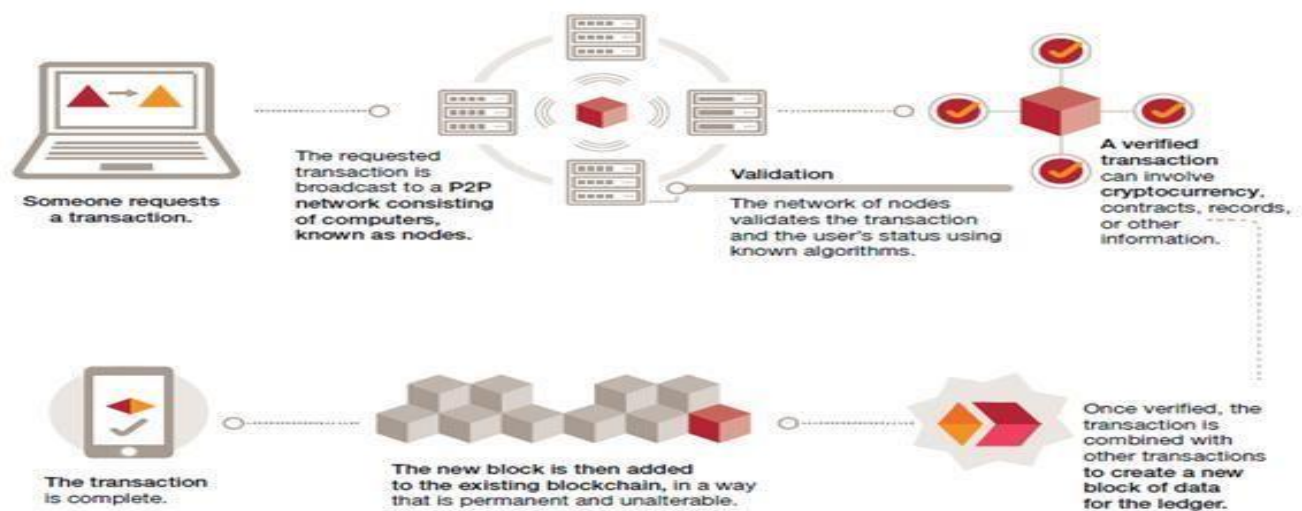
Collects and arranges data with the method **“hashing”**

A blockchain collects information together in groups, also known as blocks, that hold sets of information. Blocks have certain storage capacities and, when filled, are chained onto the previously filled block, forming a chain of data known as the “blockchain.” All new information that follows that freshly added block is compiled into a newly formed block that will then also be added to the chain once filled.

formed block that will then also be added to the chain once filled.

★ It makes the technology an ideal choice for adding an extra layer of security to the cloud storage.

★ By wisely incorporating Block chain technology in cloud storage the businesses can reduce their IT expenditure, enhance the security, and streamline the flow of information.



VIRTUALIZATION:

In computing, virtualization or virtualization is the act of creating a virtual version of something, including virtual computer hardware platforms, storage devices, and computer network resources.

● Cloud Computing can also be known as services and application delivered to help the virtualized environment.

● With the help of virtualization, the customer can maximize the resources and reduces the physical system which is in need.



Hybrid Multicloud is a cloud adoption strategy that makes it possible for public clouds, private clouds, and on-premises IT to interoperate seamlessly while leveraging the best cloud-based services from different public cloud providers.

- **Microservices architecture** is an approach in which an application is built as a collection of loosely coupled and independently deployable components or

services, leading to efficient development, maintenance, and upgradation cycles.

- **Serverless Computing** is an approach to computing that offloads responsibility for common infrastructure management tasks for application runtimes to cloud providers, allowing developers to focus their time and effort on development and testing, and not have to worry about provisioning, maintaining and scaling compute resources.
- **Cloud native applications** are applications that are built or refactored to work in the cloud environment. These applications, developed using DevOps methodologies, consist of microservices packaged in containers that can run in any environment—making it possible to create and update features in quick iterative cycles.

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Cloud storage has an infrastructure which bases on the principle of **virtualization in Cloud Computing**. Virtualization eliminates the hardware by utilizing the single hardware and making many virtual separations of it.

ADVANTAGES OF VIRTUALIZATION:

1. SECURITY

2. ECONOMICAL
3. FLEXIBLE OPERATION
4. ELIMINATES THE SYSTEM FAILURE
5. FLEXIBLE DATA TRANSFER



CLOUD STORAGE AND CONTENT DELIVERY NETWORK:

Cloud storage is a cloud computing model that stores data on the Internet through a cloud computing provider who manages and operates data storage as a service. It's delivered on demand with just-in-time capacity and costs, and eliminates buying and managing your own data storage infrastructure.

CDN: A content delivery network (CDN) refers to a geographically distributed group of servers

which work together to provide fast delivery of Internet content.

The goal is to provide high availability and performance by distributing the service spatially relative to end users.



SERVICE PROVIDERS:

1. AWS
2. GOOGLE
3. IBM
4. MICROSOFT
5. ADOBE

AWS: Amazon Web Services is a cloud computing platform that provides services such as compute power, database storage, content delivery and many other functions which will help to integrate a business.



It is one of the leading cloud service providers among all.

GOOGLE: The Google cloud platform is basically used for Google search and YouTube.

There are various services offered by Google Cloud such as data analysis, machine learning, and data storage.



IBM: IBM cloud offers services such as platform as a service and infrastructure as a service.

resources such as storage networking and Compute power with the help of internet.



MICROSOFT:

Microsoft Azure is a cloud computing service which is used for building testing deploying and managing the application.

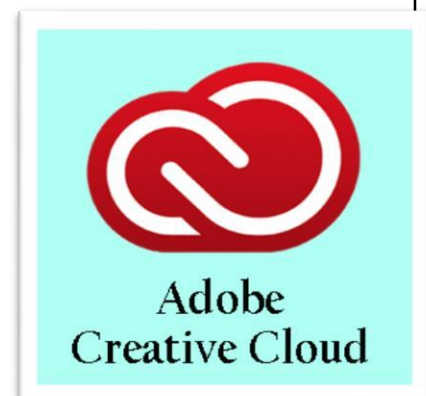
This process is done in a global network of the Microsoft-managed data centre.

It is private as well as a **public cloud** platform.

ADOBE CLOUD: Adobe creative cloud provides the best experience of apps services design photography and web.

What Is Cloud Security?

❖ Cloud security is the protection of data stored online via cloud



computing platforms from theft, leakage, and deletion.

- ❖ Methods of providing cloud security include firewalls, penetration testing, obfuscation, tokenization, virtual private networks (VPN), and avoiding public internet connections.
- ❖ Cloud security is a form of **cybersecurity**.
- ❖ Cloud security is essential for the many users who are concerned about the safety of the data they store in the cloud.
- ❖ They believe their data is safer on their own local servers where they feel they have more control over the data.



Some case studies that demonstrate the impact businesses have created by adopting cloud

- o American Airlines adopting cloud technologies to deliver customer value rapidly across its enterprise
- o UBank leveraging cloud platform services to give more control to their developers thereby removing barriers to innovation
- o Bitly leveraging the scalability offered by cloud infrastructure for low-latency delivery to its geographically disbursed enterprise customers
- o ActivTrades leveraging the infrastructure, storage, network, and security offerings on the cloud to accelerate execution and delivery of new functions in their online trading systems to their customers

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WHAT ALL YOU SHOULD TO BECOME A CLOUD SPECIALIST??

Cloud service provider, Storage,

Networking, Virtualization, Linux, Security and Disaster Recovery, Web Services And API, DevOps, programming.

REFERENCE :

INTRODUCTION OF CLOUD COMPUTING

<https://cognitiveclass.ai/>

(from the course)

Image taken from google

THANK YOU